

Unconsolidated Aquifer Systems of Ripley County, Indiana

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Two unconsolidated aquifer systems have been mapped in Ripley County: the Dissected Till and Residuum and the Pre-Wisconsin Drift. Both of these aquifer systems comprise sediments that were primarily deposited by (or resulted from) glaciers and their meltwaters, or are thin, eroded residuum (a product of bedrock weathering). Boundaries of these aquifer systems are commonly gradational and individual aquifers may extend across aquifer system boundaries. Generally, the most notable physical differences between these two aquifer systems in this county are the thickness of saturated aquifer materials and the total thickness of unconsolidated materials.

The thickness of unconsolidated sediments in Ripley County is quite variable. In much of the county, especially in the south, unconsolidated materials overlying bedrock are typically less than 30 feet thick. However, in northeastern Ripley County, because glacial deposits are generally thicker than they are in the rest of the county, the thickness of unconsolidated materials exceeds 110 feet in places.

Regional estimates of aquifer susceptibility to contamination from the surface can differ considerably from local reality. Variations within geologic environments can cause variation in susceptibility to surface contamination. In addition, man-made structures such as poorly constructed water wells, unplugged or improperly abandoned wells, and open excavations, can provide contaminant pathways that bypass the naturally protective clays.

Dissected Till and Residuum Aquifer System

The Dissected Till and Residuum Aquifer System, which covers about 95 percent of Ripley County, has the more limited ground-water resources of the unconsolidated aquifer systems in the county. Unconsolidated materials of this aquifer system predominantly consist of thin, eroded bedrock residuum and pre-Wisconsin tills. Also included in this aquifer system in many stream valleys are relatively thin deposits of alluvium and colluvium. Total thickness of this system in the county typically ranges from about 10 to 50 feet.

There is little potential for water production in the Dissected Till and Residuum Aquifer System in Ripley County. However, this aquifer system is commonly chosen for well development rather than the underlying bedrock. Large-diameter bored (bucket-rig) wells are typically used in this county to produce water from thin sands within the predominantly clay and silt materials of this aquifer system. These sands are commonly less than 2 feet thick; however, in places there are several thin sand seams separated by tills within the saturated zone. Static water levels in this aquifer system are typically between 14 and 26 feet below land surface. Commonly constructed at depths of 30 to 50 feet with 30-inch diameter porous casing, these wells are built to maximize storage. Thus, although these wells typically yield only 0.5 to 3 gallons per minute (gpm), they

are generally adequate for livestock and domestic use. The Dissected Till and Residuum Aquifer System is transected by the Pre-Wisconsin Drift Aquifer System. The boundaries between these systems are transitional in many areas of the county. Because of the generally low permeability of the near-surface materials, this system is not very susceptible to contamination from surface sources.

Pre-Wisconsin Drift Aquifer System

The Pre-Wisconsin Drift Aquifer System is mapped as several small areas, mostly located in the northeastern part of Ripley County. Many of these small areas were once connected but downcutting by modern streams has separated them and reduced their areal extent. The unconsolidated deposits overlying bedrock consist of dominantly pre-Wisconsin glacial materials that range in thickness from 15 to about 110 feet.

In some counties, this aquifer system is a limited resource, as evidenced by the lack of wells actually producing from the available unconsolidated deposits. However, in Ripley County, nearly all of the reported wells penetrating this system were completed in unconsolidated materials rather than in the underlying bedrock. Most of these wells are large-diameter (bucket-rig) wells completed by a driller skilled at installation of a successful well in these unconsolidated deposits. Potential aquifer materials within the glacial till include discontinuous intratill sand and gravel units, which tend to be clearly described on water well records. Individual sand and gravel units within this system typically range from 3 to 15 feet thick. Wells in the Pre-Wisconsin Drift Aquifer System are commonly completed at depths ranging from 35 to 50 feet with 30-inch diameter porous casing to allow for maximum storage. Static water levels are typically 12 to 25 feet below land surface, so multiple saturated sand and/or gravel units are commonly utilized in a single well. Domestic wells typically yield from 4 to 20 gpm. However, there are several wells used for industry, irrigation, and public supply which can sustain pumpage of over 100 gpm.

The Pre-Wisconsin Drift Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are generally separated from the surface by till layers within the system.

Registered Significant Ground-water Withdrawal Facilities

There are 2 registered ground-water withdrawal facilities (total of 5 wells) using unconsolidated aquifers in the county. Both of these facilities utilize the Pre-Wisconsin Drift Aquifer System. Four of these wells serve the town of Sunman. Individual wells produce from 150 to 300 gpm. Refer to Table 1 for some details on the wells and to the map for facility locations.

Map Use and Disclaimer Statement

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